

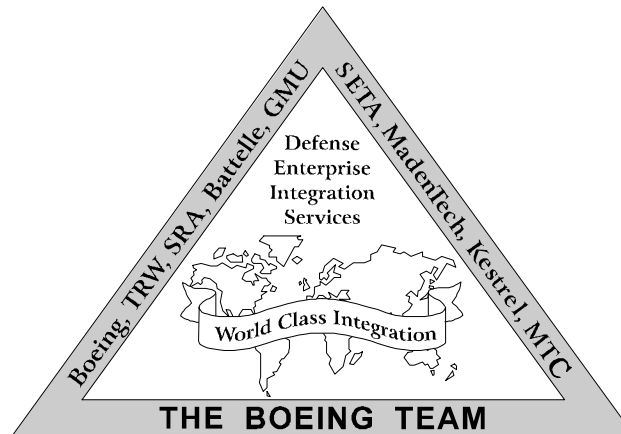
**Defense Enterprise Integration Services
Joint Requirement Analysis and Integration Directorate**

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GCCS/JOPEs Database and Applications Phase V

GCCS/JOPEs Core Database Maintenance Manual

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**TECHNICAL SUPPORT FOR
DEFENSE INFORMATION SYSTEMS AGENCY
ENTERPRISE INTEGRATION DIRECTORATE**

**DELIVERY ORDER FOR
GCCS/JOPEs DATABASE AND APPLICATIONS
PHASE V**

**GCCS/JOPEs CORE DATABASE MAINTENANCE MANUAL
31 MARCH 1997**

REVISION SUMMARY

SELECTION/APPENDIX	CHANGES
Table of Contents	Page numbering, added new appendices, added new figures.
Section 1	Updated.
Appendix A	Updated.
Appendix B	Updated.
Appendix C	Added new objects to matrices and diagrams.
Appendix D	No change.
Appendix E	Added new objects.
Appendix F	Added new objects.
Appendix G	Now maintained in Oracle. Revised definitions. Includes new objects.
Appendix H	Now maintained in Oracle. Revised definitions. Includes new objects.
Appendix I	No change.
Appendix J	Updated.
Appendix K	New Appendix to cover snapshots.
Appendix L	New Appendix to cover security views.

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SECTION 1 - GENERAL DESCRIPTION

1.1 IDENTIFICATION

This document is prepared as required by Contract Number DCA100-94-D-0016, Joint Operation Planning and Execution System (JOPES) Database Migration to the Global Command and Control System (GCCS), Contract Data Requirements List (CDRL) Line Item A042, entitled *GCCS/JOPES Core Database Maintenance Manual*. The GCCS is the follow-on system to the Worldwide Military Command and Control System (WWMCCS).

1.1.1 Scope

This document is applicable to the Defense Information Systems Agency (DISA) in activities related to the maintenance of the GCCS/JOPES Core Database.

1.1.2 Purpose and Application

This document provides reference information for the GCCS/JOPES Core Database Administrator (DBA), to application developers who build interrelated systems, and to database maintenance personnel who maintain the GCCS/JOPES Core Database. It is to be used with the Applications and System Services maintenance manuals to perform system maintenance.

1.2 SYSTEM OVERVIEW

The GCCS/JOPES Core Database was initially built to support Scheduling and Movement (S&M), a subsystem of JOPES and the focal point for command and control information on deployment activity and status. It provides a vehicle to report and track the movement of Time-Phased Force Deployment Data (TPFDD) requirements. The GCCS/JOPES Core Database represents JOPES command and control data structures that qualified for migration to the GCCS environment. Structures include, but are not limited to, database objects used by the following client/server applications:

- C S&M
- C Ad Hoc Query (AHQ)
- C Requirements Data Analysis (RDA)
- C Dynamic Analysis and Replanning Tool (DART)
- C Joint Flow Analysis System for Transportation (JFAST)
- C Logistics Sustainment Analysis and Feasibility Estimator (LOGSAFE)
- C Force Augmentation Planning and Execution System (FAPES)
- C Medical Planning and Execution System (MEPES)
- C Joint Engineering Planning and Execution System (JEPES)
- C Non-Unit Personnel Generator (NPG)

- C Pre-Defined Reports (PDR)
- C Reference File Administration (RFA).

1.3 DOCUMENT OVERVIEW

The database maintenance procedures share few similarities with other software maintenance procedures. The contents of each section may not match software maintenance manuals. The document is tailored specifically for database maintenance developers.

1.3.1 Organization

Section 1 describes the identification and scope of the *GCCS/JOPES Core Database Maintenance Manual*. It provides an overview of the system, the development approach, the hardware and software, and a brief description of the appendices.

In addition to this introductory section, this document is divided into 12 appendices. Output from the Computer Aided Systems Engineering (CASE) tool, System Architect, appears in the document. To help realize CASE productivity gains, diagrams and reports produced with System Architect are presented in generated format.

Each appendix contains detailed descriptive information as summarized below.

- C **APPENDIX A: Referenced Documents.** This appendix provides a list of unclassified documents used during development of this maintenance manual. In the event of conflict between documents referenced herein and the contents of this document, the contents of this document shall take precedence.
- C **APPENDIX B: Acronyms and Abbreviations.** This appendix contains a list of acronyms and abbreviations used in the document.
- C **APPENDIX C: Program Maintenance Procedures.** This appendix provides a description of database structures presented graphically with System Architect-generated Entity Relationship (E/R) diagrams.
- C **APPENDIX D: GCCS/JOPES Core Backup/Recovery Software.** This appendix provides a description of the architecture and design of backup/recovery and Client/Server (C/S) data load software.
- C **APPENDIX E: GCCS/JOPES Core Entity Name List.** This appendix includes the entity name, naming prefix, and information about whether the entity originated during the S&M database phase or the Core Database phase.

- C **APPENDIX F: GCCS/JOPEs Core Element Name List.** This appendix includes the element name, information about whether the element originated during the S&M database phase or the Core Database phase, and a source for the element's name.
- C **APPENDIX G: GCCS/JOPEs Core Entity Definitions.** This appendix contains definitions for all of the Core Database entities.
- C **APPENDIX H: GCCS/JOPEs Core Element Definitions.** This appendix contains definitions for all of the Core Database elements.
- C **APPENDIX I: JOPEs LDM Deviations.** This appendix includes the following subsections:
- **I-1: LDM to GCCS/JOPEs Core Element Naming Deviations.** This appendix contains a list of elements that deviate from Logical Data Model (LDM) element names, the type of deviation, and the reason for the deviation.
 - **I-2: LDM to GCCS/JOPEs Core Table Mapping/Deviations.** This appendix contains a list of tables and the associated LDM table entity to which it is mapped.
- C **APPENDIX J: GCCS/JOPEs Core ORACLE Data Definitions.** This appendix contains the Data Definition Language (DDL) statements and Structured Query Language (SQL) reports defining data structures, keys, indexes, and constraints. It contains the following subsections:
- **J-1: Create Database DDL**
 - **J-2: Create Tablespaces DDL**
 - **J-3: Synonyms Report**
 - **J-4: Indexes Report by Format**
 - **J-5: Create Database Sequence Numbers DDL**
 - **J-6: Constraints Report by Format**
 - **J-7: Column Description Report**
 - **J-8: Table Description Report**
 - **J-9: Referential Integrity Report**

- C **APPENDIX K: Snapshots.** This appendix gives an overview on snapshots as they are implemented in the GCCS Core Database. It contains the following subsections:
- **K-1: Snapshot Architecture**
 - **K-2: Snapshot Creation Process**
 - **K-3: Snapshot Administration**
 - **K-4: Snapshot Related Reports**
 - **K-5: Snapshot Related Scripts**
- C **APPENDIX L: Security Views.** This appendix gives an overview of the purpose and creation of the security views.

1.3.2 Conventions

The following conventions apply throughout the document:

- C UPPER CASE denotes menu screen titles and menu screen selections.
- C **"bold within quotations"** represents messages that appear on the screen.
- C **DOUBLE UNDERLINED BOLD** denotes tape label names.
- C **UPPER CASE BOLD** represents ORACLE tablespaces, tables, and views. It is also used to represent mainframe files.
- C **lower case bold** represents Unix files, modules, and all other programs. It is also used to identify important terminology throughout the document.
- C *UPPER CASE ITALIC* represents ORACLE commands and all other commands that must be entered in upper case text.
- C *lower case italic* represents Unix commands and all other commands that must be entered in lower case text.
- C *<bracketed italic>* represents commands entered by the user on the command-line.
- C *UNDERLINED italic* represents variables and arguments. Upper and lower case represent the appearances in common use.

1.4 DEVELOPMENT APPROACH DESCRIPTION

The GCCS/JOPEs Core Database design effort covered three incremental design iterations. The first iteration produced the ready-to-field S&M database. The second iteration, augmenting the S&M database, produced the GCCS/JOPEs Core Database. The third iteration refined the GCCS/JOPEs Core Database to fully support all prospective GCCS applications. The approach described in the following section was used for each iteration.

1.4.1 S&M Design

The development approach for the first iteration, S&M, is shown in Figure 1-1. Development began with the creation of the S&M Transformation Model fed by two key inputs: the JOPEs LDM and the S&M Software Requirements Specification (SRS) (30 Jun 1992). The transformation model was next designed for the server ORACLE environment and S&M application resulting in a physical ORACLE database. Finally, procedures and code were prepared to create and load the S&M ORACLE database. Finally, procedures and code were prepared to create and load the S&M ORACLE database.

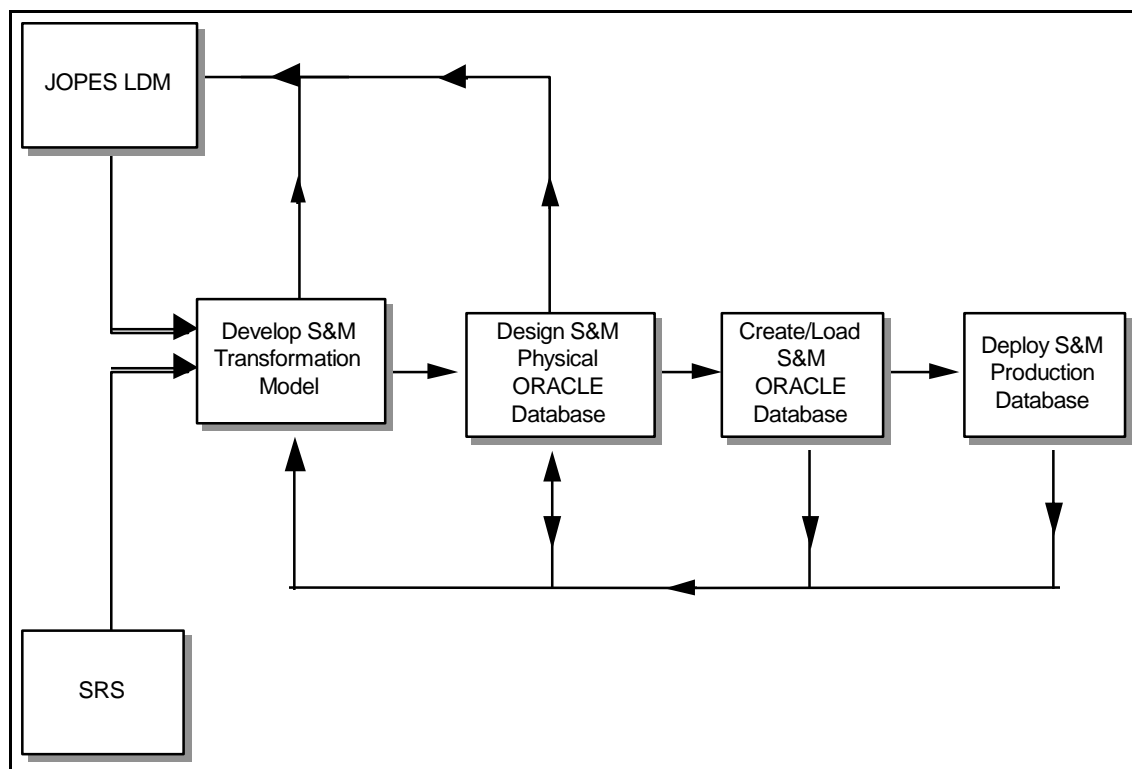


Figure 1-1: S&M Client-Server Database Development Approach.

The first activity, development of the S&M transformation model, is shown in Figure 1-2. The JOPEs LDM and S&M SRS served as primary inputs to transformation model development. Review of Integrated Data Store/Version I (IDS/I) data structures, definition of business rules, and analysis of data requirements provided additional refinement. At each step of development, government functional and technical experts worked with their S&M counterparts to provide

guidance and validation. Other development activities included analysis of S&M application access patterns, determination of backup and recovery requirements, and initial database sizing. Changes to the JOPEs LDM were proposed during this cycle and continued iteratively throughout the development life cycle.

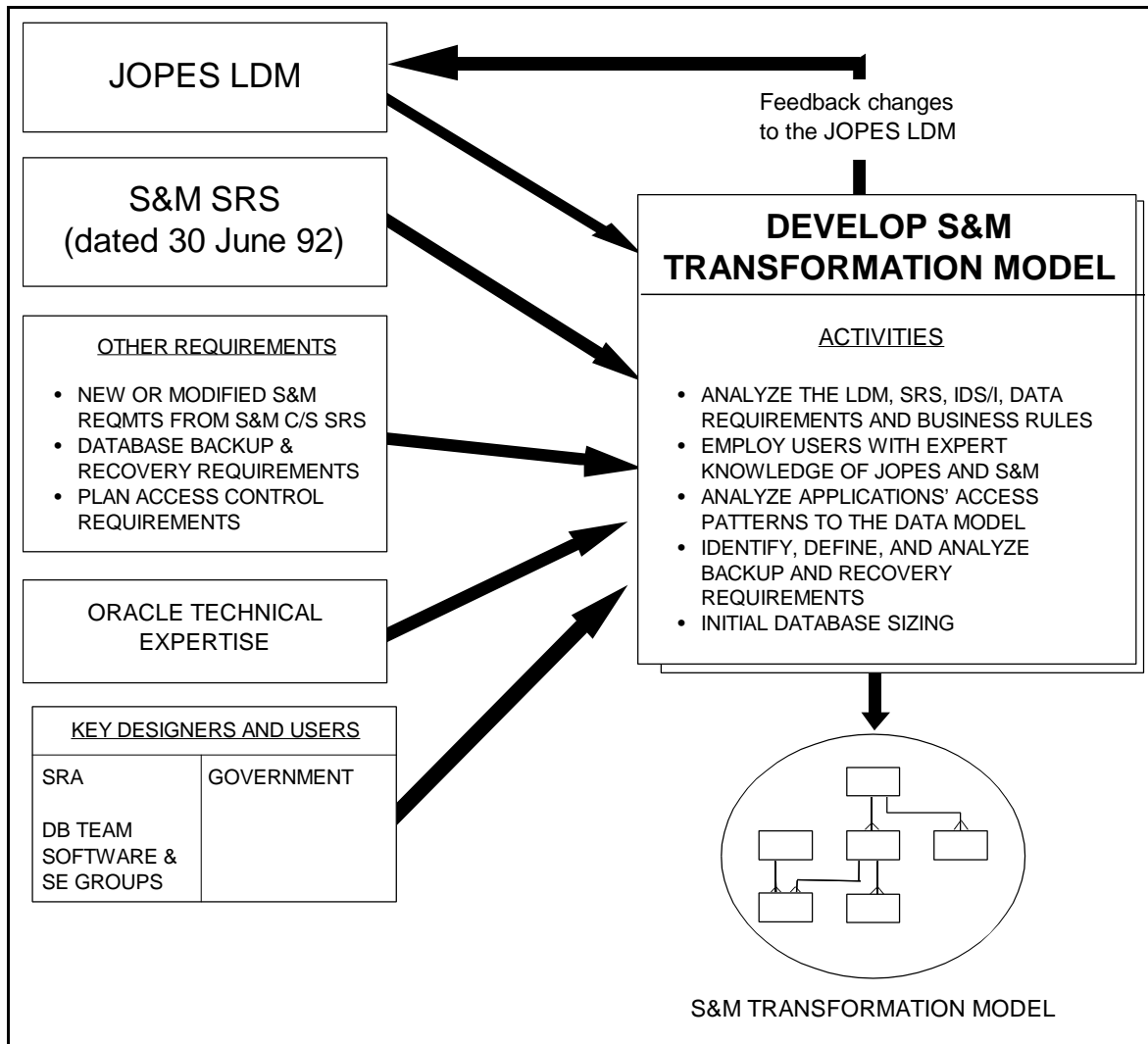


Figure 1-2: Development of the S&M Transformation Model.

The second activity, design of the S&M physical ORACLE database, is shown in Figure 1-3. The focus of physical design was implementation of the transformation model. Key inputs to this process were the S&M transformation model, input from software developers, and the database team's technical expertise. Activities during this phase included definition of ORACLE configuration parameters, entity normalization and denormalization, and definition of ORACLE tablespaces, tables, and indices. Other activities during physical design included benchmarking of application functions, detailed sizing estimates, and refinement of backup and recovery procedures. Products of the physical design process included flat file definitions for data conversion and validation mapping, and

ORACLE DDL. Initial creation of DDL was accelerated using the generation capabilities of System Architect, whenever possible.

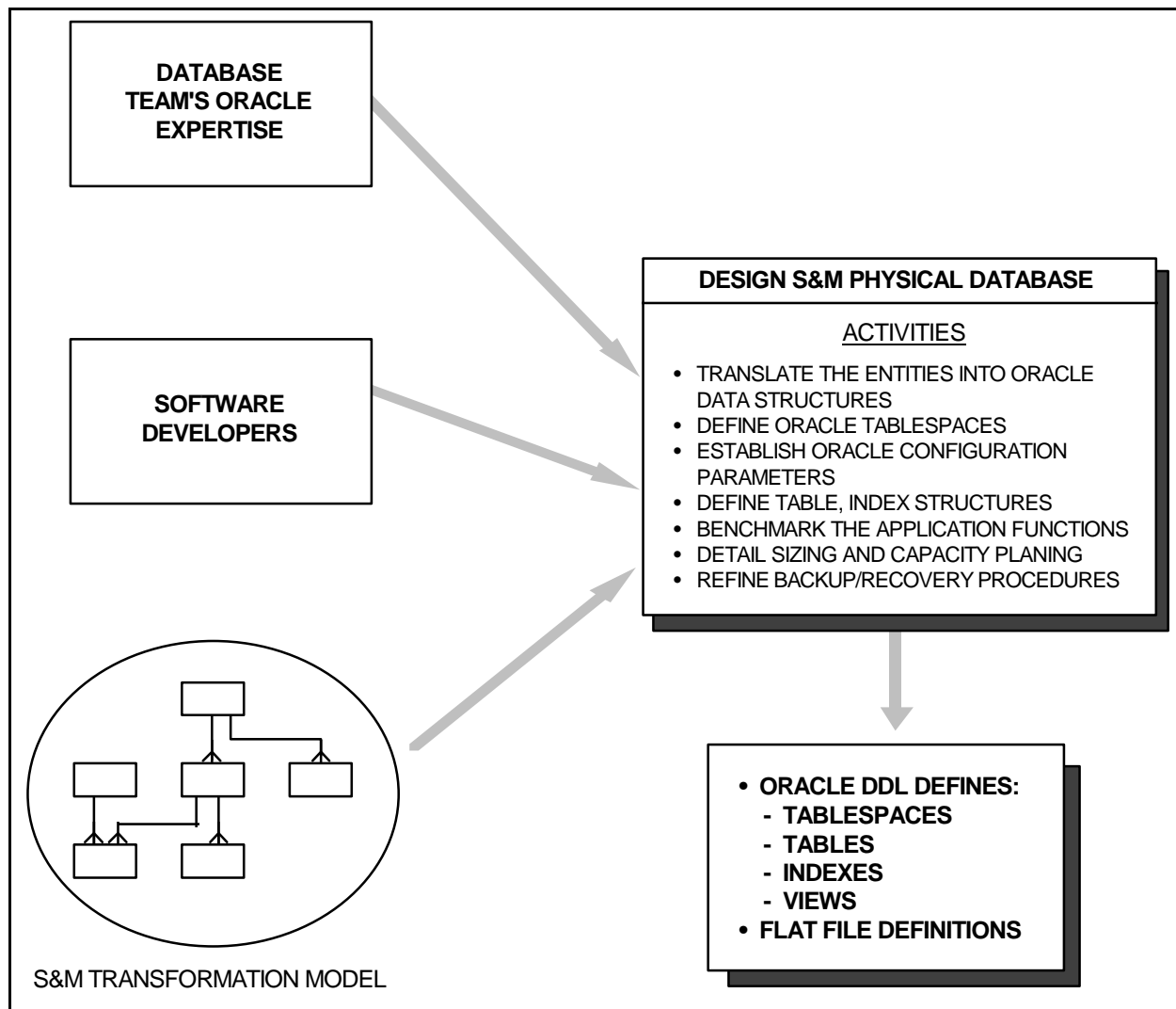


Figure 1-3: Design of the S&M Physical ORACLE Database.

The third activity, creation and load of the S&M ORACLE Database, is shown in Figure 1-4. The focus for this phase was creation of data load scripts and database performance tuning.

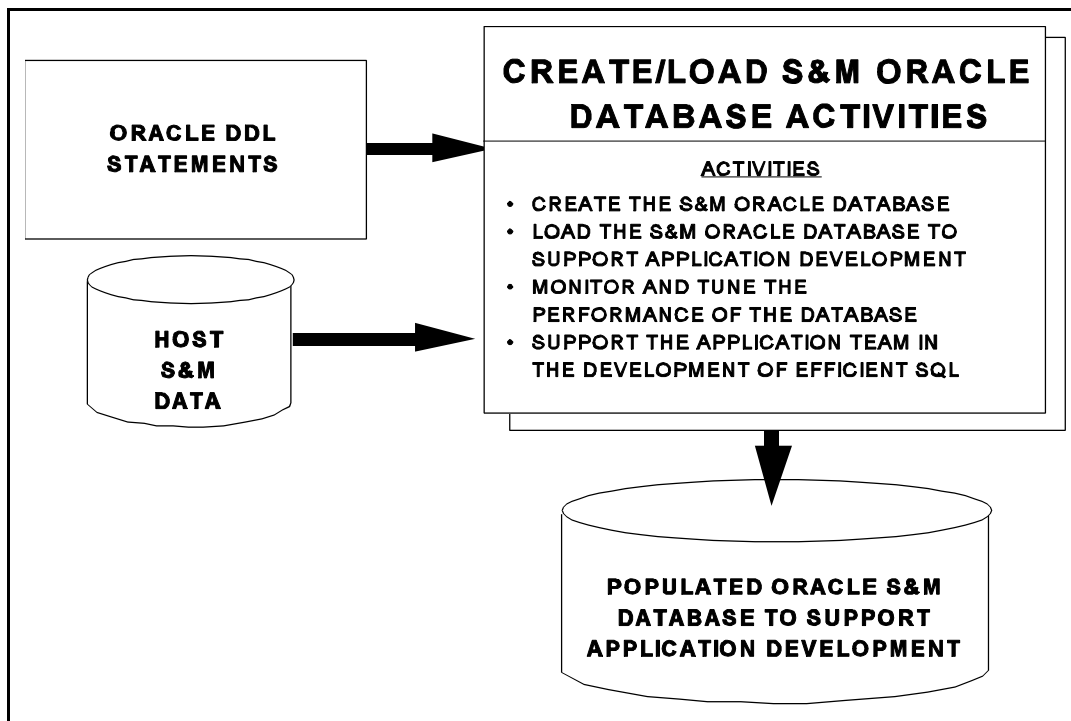


Figure 1-4: Creation and Loading of the S&M ORACLE Database.

Key inputs to this process were ORACLE DDL statements and host S&M data. Data load activities included development of ORACLE SQL*Loader and SQL scripts, development of procedures, and local testing. In addition, Systems Research and Applications (SRA) Corporation provided technical support for production-data extract and load testing at DISA's Operational Support Facility (OSF). Database performance tuning activities benchmarked the database over a comprehensive activity range. Tuning activities included over 20 individual test cases and a grand test which stressed the database under conditions of heavy load. In addition, extensive SQL tuning was performed in support of applications development. Products of the creation and load process include a performance test database to support application development, refined DDL statements, and initial configuration settings to support the production environment.

1.4.2 GCCS/JOPEs Core Design

The second design iteration used an abbreviated S&M database development approach shown in Figure 1-5. All GCCS/JOPEs Core development activities focused on enhancement of S&M database structures to support mainframe migration. Development began with creation of the GCCS/JOPEs Core transformation model, fed by the S&M Physical Database, the JOPEs LDM, and IDS/I data structures. The transformation model was next structured for the server ORACLE environment resulting in a physical ORACLE database. Database creation DDL statements were also prepared. GCCS/JOPEs Core Database structures were created in the database ready for application tuning and load activities.

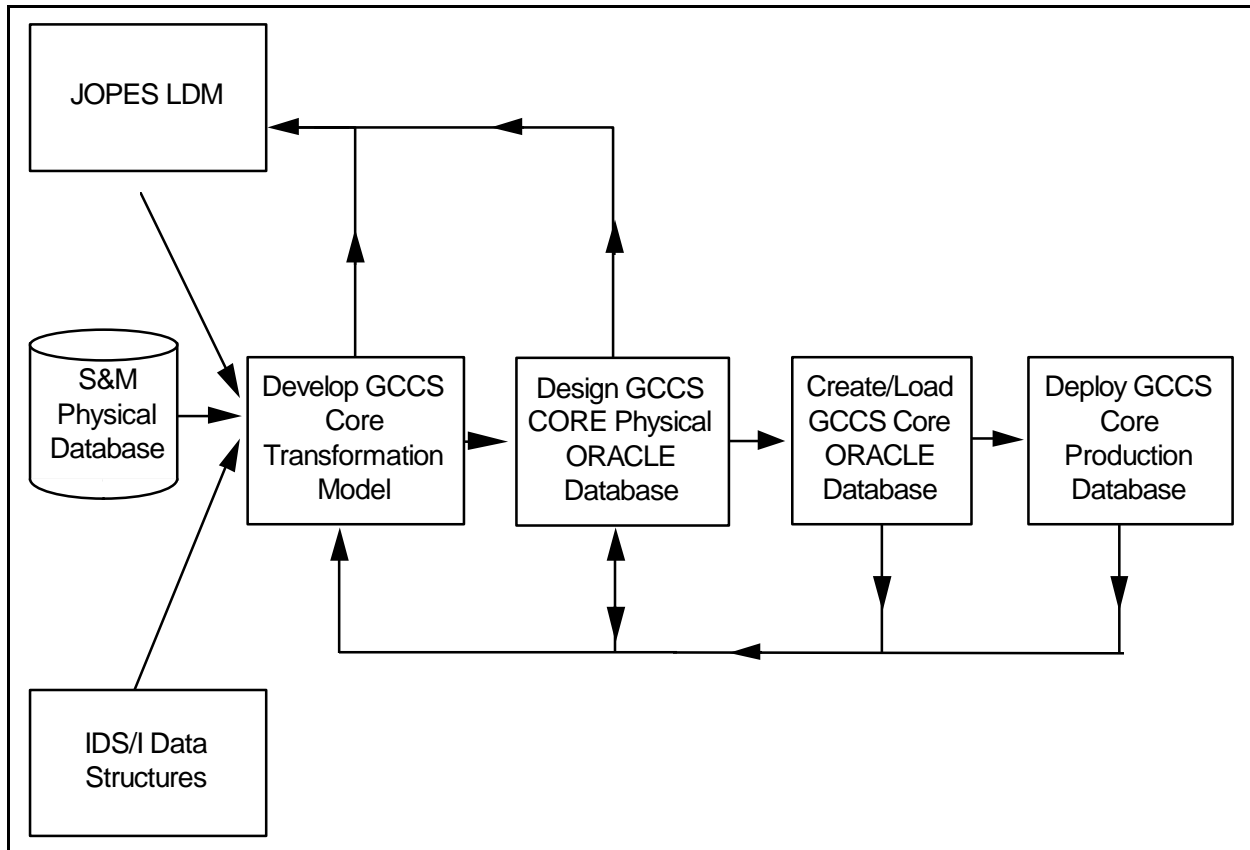


Figure 1-5: GCCS/JOPEs Core Client Server Database Development Approach.

1.4.3 GCCS/JOPEs Core Refinement

The third design iteration, GCCS/JOPEs Core refinement, focused on validating all GCCS/JOPEs Core Database entities and relationships. The following candidate GCCS applications were analyzed to validate that the GCCS/JOPEs Core satisfied common database requirements:

- C S&M
- C RDA
- C DART
- C JFAST
- C LOGSAFE
- C FAPES
- C MEPES
- C JEPES
- C NPG.

All GCCS/JOPEs Core development activities focused on enhancement of database structures to support mainframe migration. Development began with creation of the GCCS/JOPEs Core transformation model, fed by the S&M Physical Database, the JOPEs LDM, and IDS/I data structures. The transformation model was next structured for the server ORACLE environment resulting in a physical ORACLE database. Database create DDL statements were also prepared. GCCS/JOPEs Core Database structures were created in the database ready for application tuning and load activities.

1.5 DESCRIPTION OF REQUIRED HARDWARE

Each target site for the GCCS/JOPEs Core Database will have a standard GCCS 2.X configuration. As shown in Figure 1-6, the GCCS system configuration for each site includes a Local Area Network (LAN) linking a database server and several workstations.

For the initial dataload, the WWMCCS/JOPEs mainframe host (a Data Processing System (DPS) 8(000)) provides TPFDD files and standard reference files which are downloaded (over the LAN) to the GCCS Database server. TPFDDs and supporting files will be uploaded as required from the server to the host. After the initial load, TPFDD and standard reference data will be maintained directly on the servers.

The LAN has critical functions:

- C Connectivity between the workstations and the database server to support operations in S&M and other applications
- C Connectivity between servers within a domain to support transaction-based database updates.

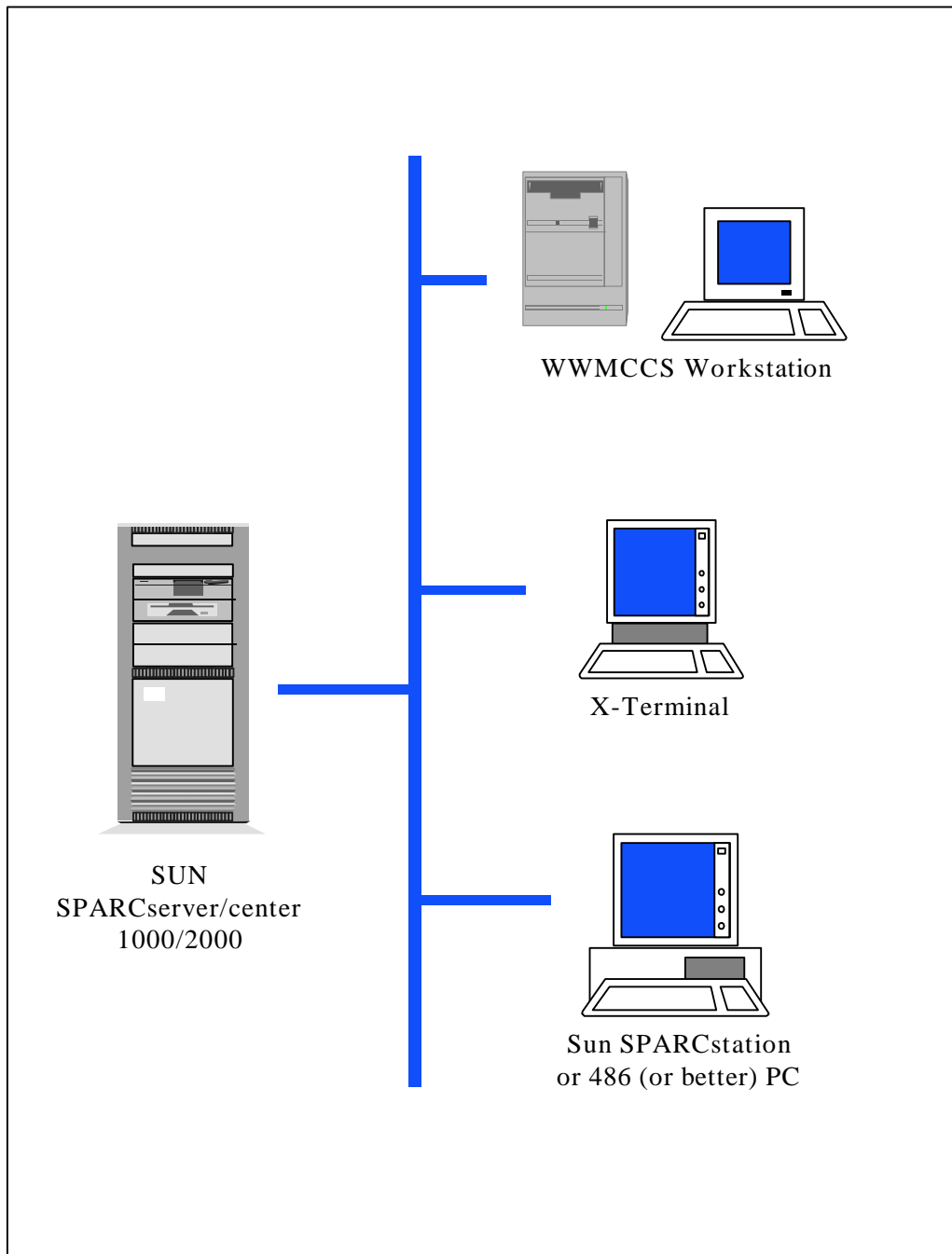


Figure 1-6: GCCS/JOPE Hardware Architecture.

The database server supports a single ORACLE instance comprised of multiple tablespaces supporting both GCCS/JOPE Core structures and application-specific objects.

1.5.1 LAN Hardware

All sites must have a secure LAN supporting the Transmission Control Protocol (TCP) Internet Protocol (IP) protocol that will interconnect the GCCS Database server to all GCCS workstations.

1.5.2 Server Hardware

Each designated GCCS/JOPEs Core Database site will receive at least one GCCS Database server. The servers will be either Sun SPARC SERVER 1000 or SPARCcenter 2000 and will be configured based upon site functional requirements. Current server hardware configurations are defined in the *Software Development Plan*, SDP-97-D0070-0028 and the *Software Test Plan*, STP-97-D0070-0020.

1.6 DESCRIPTION OF REQUIRED SOFTWARE

Each target site for the GCCS/JOPEs Core Database will have the same database software requirements regardless of configuration.

1.6.1 Server Software

Each server, regardless of hardware configuration, will include the standard Commercial Off-the-Shelf (COTS) software identified in Table 1-1.

Table 1-1: GCCS/JOPEs Server Software.

DESCRIPTION	VERSION
SunOS (Solaris)*	Release 2.3 or higher
ORACLE Relational Database Management System	Version 7.1.4 or higher
NeWSprint	Version 2.5

* The file transfer utility FTP must be installed (Version 4.1 or higher)

1.6.2 Workstation Software

GCCS/JOPEs Core Database workstations include Sun SPARC Stations, WWMCCS Information System (WIS) Workstations (WWS) and IBM PCs or clones. Access to the server GCCS/JOPEs Core Database is accomplished through the various user interface products. All software requirements for S&M applications is described in the *S&M Maintenance Manual*.

APPENDIX A

REFERENCED DOCUMENTS

APPENDIX A - REFERENCED DOCUMENTS

The following unclassified documents may be of interest to readers of this manual. In the event of conflict between documents referenced herein and the contents of this document, the contents of this document shall supersede.

A.1 GOVERNMENT DOCUMENTS

The following documents may be of interest in conjunction with this maintenance manual:

Implementation Procedures (IP) Document for Automated Information Systems (AIS) Technology Insertion Project (TIP) Site Installation Plan. CDRL R003/R. SRA Corporation, 4 February 1994.

TD 18-14-1 JOPES Functional Database Manager (FDBM) Users Manual. Defense Systems Support Organization, 17 August 1993.

TD 18-17 JDS Data Base Specification. United States Transportation Command (TCJ6-D), 30 September 1988.

TD 18-64 JOPES Technical Database Manager's (TDBM) Handbook. Defense Systems Support Organization, 16 August 1993.

DS 143-94 Joint Operation Planning System (JOPS) Database Specification. Defense Information Systems Organization, 16 August 1994.

Revised Software Test Plan/Software Test Description, Scheduling and Movement Client/Server Applications, CSCI, CDRL H00A/R, 17 March 1994.

Software Requirements Specification (SRS), Scheduling and Movement (S&M) Client/Server (C/S), Change Pages. CDRL H005. SRA Corporation, 12 January 1994.

Software Development Plan for the JOPES Database Migration to GCCS. Boeing Information Services, Inc., 9 February 1996.

JOPES Logical Data Model (LDM). SRA Corporation, 30 September 1993.

JOPES Database Installation Plan. CDRL R003. SRA Corporation, 17 May 1995.

GCCS Software Development Plan. SDP-97-D0070-0028. SRA Corporation, 3 March 1997.

S&M Site Installation Plan. S&MIP-95-D0024-002. SRA Corporation, 15 May 1995.

System Services User Handbook. SSUH-95-D0024-0024. SRA Corporation, 22 August 1995.

System Services Maintenance Manual. SSMM-95-D0024-0026. SRA Corporation, 8 September 1995.

System Services Administrator's Manual. SSAM-97-D0070-0038. SRA Corporation, 31 March 1997.

IMS/RFM Users' Handbook. IMS/RFMUH-96-D0048-0010. SRA Corporation, 11 March 1996.

AHQ Users' Manual. AHQUM-97-D0070-0034. SRA Corporation, 31 March 1997.

AHQ Maintenance Manual. AHQMM-95-D0024-0054. SRA Corporation, 15 November 1995.

MEPES User's Manual. MUM-96-D0048-0011 SRA Corporation, 8 March 1996.

MEPES Maintenance Manual. MMM-95-D0024-0033. SRA Coproration, 22 September 1995.

GCCS/JOPES Database Migration Software Test Plan. STP-97-D0070-0020. SRA Corporation, 31 March 1997.

JOPES Version 3.3.4 Site Installation Plan. JSIP-95-D0024-0040. SRA Corporation, 29 September 1995.

GCCS System Administrator's Manual. MM.HOOJ.06. SRA Corporation, 14 June 1995.

NPG User's Manual. NPGUM-96-D0048-0016. SRA Corporation, 8 March 1996.

NPG Maintenance Manual. NPGMM-95-D0024-0056. SRA Corporation, 21 November 1995.

A.2 NON-GOVERNMENT DOCUMENTS

Non-Government documents used during development of this maintenance manual include:

- C DPS 8(000) — GCOS 8 reference material,
- C DN8 reference material,
- C HAU reference material,
- C Sun Server — Sun (Corporation) Operating System (SunOS) reference material, and Oracle reference material.

Oracle Corporation Documents may be ordered from:

ORACLE Server Documentation Manager
Oracle Corporation
500 Oracle Parkway
Redwood Shores, CA 94065
Phone: (415) 506-7000
FAX: (415) 506-7200

APPENDIX B

ACRONYMS AND ABBREVIATIONS

APPENDIX B - ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this document:

ACC	Air Combat Command
AFLANT	Air Force Atlantic Command
AFMC	Air Force Materiel Command
AHQ	Ad Hoc Query
AIS	Automated Information System
AMC	Air Mobility Command
ARCENT	Army Forces Central Command
AREUR	Army Europe
ARPAC	Army Forces Central Command
ASCII	American Standard Code for Information Interchange
ASSETS	Transportation Assets File
APORTS	Aerial Ports and Air Operating Bases
BCD	Binary-Coded Decimal
BNC	Barrel Nut Connector
CASE	Computer Aided Systems Engineering
CDRL	Contract Data Requirements List
CENTAF	Air Force Central Command
CENTCOM	Central Command
CHSTR	Characteristics of Transportation Resources
CIN	Cargo Increment Number
CNO	Chief of Naval Operations
COTS	Commercial Off-the-Shelf
CPU	Central Processing Unit
CR	Change Request
C/S	Client/Server
DA	Department Army
DART	Dynamic Analysis and Replanning Tool
DAT	Digital Audio Tape
DBA	Database Administrator
DDL	Data Definition Language
DISA	Defense Information Systems Agency
DN8	Datanet 8
DPS	Data Processing System
DSSO	Defense Systems Support Organization
E/R	Entity Relationship
ERD	Entity Relationship Diagram

ECP	Engineering Change Proposal
EOB	End of Backup
EOF	End of File
EUCOM	European Command
FAPES	Force Augmentation Planning and Execution System
FDBM	Functional Database Manager
FORSCOM	Forces Command
FTP	File Transfer Protocol
GCCS	Global Command and Control System
GEO	Geographic Location Code
GEOLOC	Geographic Location Code
GUI	Graphical User Interface
GSORTS	Global Status of Resources and Training System
HAU	Host Attachment Unit
HQ	Headquarters
IDS	Integrated Data Store
IDS/I	Integrated Data Store/Version I
IMS	Information Management Subsystem
I/O	Input/Output
IP	Internet Protocol
IP	Implementation Procedures
JCL	Job Control Language
JDS	Joint Deployment System
JEPES	Joint Engineering Planning and Execution System
JES	JOPEX Executive Subsystem
JFAST	Joint Flow and Analysis System for Transportation
JOPEX	Joint Operation Planning and Execution System
JOPS	Joint Operation Planning System
JTO	Joint Training Organization
Kbps	Kilobits per second
LAN	Local Area Network
LDM	Logical Data Model
LFF	Logistics Factors File
LOGSAFE	Logistics Sustainment Analysis and Feasibility Estimator
MB	Megabytes
Mbps	Megabits per second
MEPES	Medical Planning and Execution System
MMI	Man-Machine Interface

MSC	Military Sealift Command
MTMC	Military Traffic Management Command
NAVCENT	Naval Forces Central Command
NAVEUR	Naval Force Europe
NIS	Network Information System
NMCC	National Military Command Center
NPG	Non-Unit Personnel Generator
OPLAN	Operation Plan
OSF	Operational Support Facility
PACAF	Pacific Air Forces
PACFLT	Pacific Fleet
PACOM	Pacific Command
PDR	Pre-Defined Reports
PIN	Personnel Increment Number
PORTS	Port Characteristics
QA	Quality Assurance
RAM	Random Access Memory
RDA	Requirements Data Analysis
RFA	Reference File Administration
RFM	Reference File Manager
S&M	Scheduling and Movement
SA	System Administrator
SCSI	Small Computer System Interface
SE	Software Engineering
SGA	System Global Area
SIMM	Single In-line Memory Module
SOCOM	Special Operations Command
SOUTHCOM	Southern Command
SPACECOM	Space Command
SPARC	Scalable Processor Architecture
SRA	Systems Research and Applications
SRS	Software Requirements Specification
SQL	Structured Query Language
STRATCOM	Strategic Command
SunOS	Sun(Corporation) Operating System
TCP	Transmission Control Protocol
TDBM	Technical Database Manager
TIP	Technology Insertion Project
TPFDD	Time-Phased Force and Deployment Data

TUCHA Type Unit Characteristics
TUDET Type Unit Equipment Detail

ULN Unit Line Number
USAF United States Air Force
USAFE United States Air Force Europe
USASOC United States Army Special Operations Command
USFK United States Forces Korea
USTRANSCOM United States Transportation Command

WIS WWMCCS Information System
WWMCCS Worldwide Military Command and Control System
WWS WIS Workstations